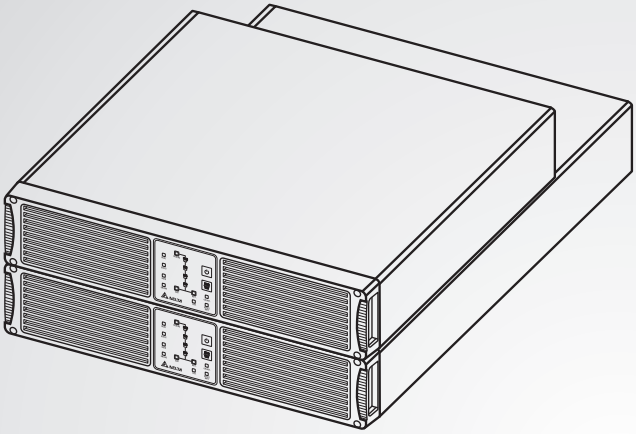

The power behind competitiveness

Delta UPS - Amplon Family

M Series, Single Phase
1/ 1.5/ 2/ 3 kVA

User Manual

www.deltapowersolutions.com

Smarter. Greener. Together.

Save This Manual

This manual contains important instructions and warnings that you should follow during the installation, operation, storage and maintenance of this product. Failure to heed these instructions and warnings will void the warranty.

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Chapter 1 : Important Safety Instructions

1.1 Safety Instructions

- **Intended Use**

  1. This unit serves as a line-interactive uninterruptible power supply (UPS) for connected loads.
  2. Never connect a laser printer or scanner to the UPS. This may cause damage to the unit.
  3. The UPS is available in 1kVA, 1.5kVA, 2kVA and 3kVA. Each model has internal batteries.
  4. Only 3kVA model can be connected to a Delta external battery pack (optional).
  5. The UPS can be used to power computers and associated peripheral devices, such as monitors, modems, cartridge tape drives, external hard drives, etc.

- **Handling**

  Transport the unit only in suitable packaging to protect it from jolts and shocks. The UPS must be kept upright at all times and handled with care.

- **Placement & Installation Warnings**

  1. Install the UPS in a well-ventilated area, away from extremes of temperature, excess moisture, heat, dust, flammable gas or explosives.
  2. Leave adequate space at least 15cm in front and rear of the UPS for proper ventilation.
  3. Electrical maintenance and service requires access to the front and back of the UPS. Leave necessary space to allow service personnel to access to the UPS.
  4. The UPS can be installed vertically (tower-mounting) or horizontally (rack-mounting) depending on user's desired arrangement. Please obey the following:

     1) Do not mount the UPS with its front or rear panel facing down at any angle.

2) Keep the UPS upright at all times and handle it with care.

3) Do not stack units.

4) Do not place any objects on the UPS, the Delta external battery pack or any other accessory associated with the UPS.

5) Install the UPS and the Delta external battery pack on a level and even surface.

6) For tower-mounting installation, ensure that your chosen location's floor can bear the weight of the UPS, the Delta external battery pack and tower stands (optional).

7) For rack-mounting installation, make sure your chosen cabinet can support the weight of the UPS, the Delta external battery pack and rails that may be mounted in an associated rack. You also need to take your chosen location's floor weight loading into consideration.

8) For rack-mounting installation, do not allow your rack to become 'top heavy'. Install the heaviest equipment near the bottom of the rack.

9) Weights for the UPS and the Delta external battery pack are shown in ***Appendix 1 : Specifications***.

10) Install the UPS in accordance with the conditions specified in ***3.1 Installation Data***.

5. The ideal operating temperature range is 0°C~40°C.

- **General Warnings**

1. Electrical shock hazard: even when the UPS is disconnected from the mains, hazardous voltages may still exist at the output receptacles of the UPS. Before maintenance, cut off not only the AC source but also the battery source.

2. Even when all switches and/ or circuit breakers are open, dangerous voltages are present within this unit.

3. Forbid opening or removing the cover of the UPS to avoid high voltage electric shock. There are no user-serviceable parts inside.

4. Maintenance service must be performed by qualified service personnel. Only qualified service personnel can carry out any operation that requires protection panels to be opened and/or removed.

5. Any repairs or modifications by the user may result in out-of-warranty repair charges or unsafe electrical conditions.

6. Do not use extension cords to connect the UPS to an AC outlet.
7. Do not plug the UPS input cord into its own output receptacles.

- **Usage Warnings**

1. Before usage, you must unpack the UPS and allow it to adjust to room temperature (20°C~25°C) for at least two hours to avoid moisture condensing inside the UPS.
2. The external slits and openings in the UPS are provided for ventilation. To ensure reliable operation of the UPS and to protect the UPS from overheating, these slits and openings must not be blocked or covered. Do not insert any object into the slits and openings that may hinder ventilation.
3. Even though all buttons are in the **OFF** position, the UPS is not isolated from the mains. To completely isolate the UPS from the mains, please disconnect the input power cord.
4. This unit supplies power from two sources, the mains and the batteries. The output receptacles may have voltage present even when the unit is unplugged. Unplugging the UPS puts it into battery mode and the batteries supply power to the connected loads.
5. Route all cords well so that nobody can stand on them or trip over them.
6. When connecting the unit to the power supply, follow the instructions stated in ***Chapter 4 : Connections***.
7. Ensure that no objects (e.g. rings, necklaces, paper clips, etc) get inside the unit.
8. In an emergency, switch off the unit, disconnect it from the mains and contact the responsible customer service representative.
9. Do not connect equipment that will overload the UPS and demand DC current.
10. Do not connect or disconnect data transmission lines during a thunderstorm.
11. The sum of current leakage from the UPS and its connected loads must not exceed 3.5 mA.
12. The UPS has a REPO (remote emergency power off) port locating on the rear. Please see ***5.2 Other Operating Details*** for more information.
13. The UPS must be well grounded due to a possible risk of current leakage. The unit is equipped with a safety-inspected mains line and must be

connected to an earthing-contact wall socket. If the wall socket does not have an earthing connection, please ground the UPS via the ground terminal locating at the rear of the UPS (please see ***2.5 Rear Panel***).

14. Ensure that the sockets on the unit or the earthing-contact wall socket is freely accessible.

- **Battery Precautions**

1. Do not open or mutilate the battery or batteries. The released electrolyte is harmful to the skin and eyes and may be toxic.
2. Do not dispose of the battery or batteries in a fire. The batteries may explode.
3. The risk of dangerous high voltage is possible when the batteries are still connected to the UPS even though the UPS is disconnected from the mains. Do not forget to pull out the battery cable to completely cut off the battery source.
4. Voltage is always present on the battery terminals.
5. Even when discharged, a battery has the capacity to supply a high short circuit current, which, in addition to causing damage to the battery itself and to associated cables, may expose the operator to the risk of burns.
6. Do not keep batteries in storage for periods exceeding 6 months at 25ºC without being recharged (having been charged to 100% at the beginning of any such period). If these conditions are not met, the battery performance can no longer be guaranteed. It is recommend that you recharge the internal batteries at least once every 3 months and each recharging time should not be less than 6 hours. If a Delta external battery pack is connected, the recharging time should not be less than 12 hours.
7. Since new batteries often do not provide full capacity after an initial charge, it may be necessary to carry out a number of discharge/recharge cycles before optimum performance is achieved.
8. Servicing of batteries and battery packs should be performed or supervised by qualified service personnel knowledgeable in batteries, battery packs and the required precautions.
9. Only use the same type of batteries from the same supplier. Never use old, new and different Ah batteries at the same time.
10. A battery can present a risk of electrical shock and high short-circuit current.

The following precautions should be observed before replacement of batteries:

1) Remove watches, rings, or other metal objects.
2) Use tools with insulated handles.
3) Wear rubber gloves and boots.
4) Do not lay tools or metal parts on top of batteries.
5) Disconnect charging source prior to connecting or disconnecting battery terminals.

- **Disposal**

1. To protect our environment, UPS & batteries must be disposed of in accordance with local laws and regulations.
2. For proper UPS & battery disposal, contact your local recycling/ reuse or hazardous waste center.

WARNING!

You must contact qualified service personnel if either of the following events occur:

1. Liquid is poured or splashed on the UPS or on the Delta external battery pack.
2. The UPS does not run normally after this User Manual is carefully observed.

1.2 Glossary of Symbols

No.	Symbol	Description
1		ON/ OFF Button
2		MUTE/ TEST Button
3		OVERLOAD LED
4		FAULT LED

No.	Symbol	Description
5		BOOST LED
6		BUCK LED
7		ONLINE LED
8		LOAD LED
9		BATT. LED
10		S.W.F. (Site Wiring Fault) LED
11		REPLACE BATT. LED
12		ON BATT. LED
13		Bar Graph LEDs

1.3 Standard Compliance

- CE
- CB Report (by TUV)
- EN 62040-1
- EMC EN62040-2 C1

1.4 Storage

- **Prior to installation:**

  If the UPS needs to be stored prior to installation, it should be placed in a dry area. The allowable storage temperature and relative humidity (non-condensing) are -15°C ~ +45°C and 0 ~ 95% respectively.

- **After usage:**

  Press the ON/OFF button ( ), make sure the UPS is shutdown, disconnect the UPS from the utility power, remove all equipment from the UPS, and store the UPS in a dry and well-ventilated area at a temperature between -15°C and +45°C and at a relative humidity (non-condensing) between 0~95%. Idle batteries must be recharged fully approximately every three months if the UPS needs to be stored for an extended period of time. The charging time must not be less than 6 hours each time. If a Delta external battery pack is connected, the recharging time should not be less than 12 hours.

  NOTE : After storage and before start-up of the UPS, you must allow the UPS to adjust to room temperature (20°C~25°C) for at least two hours to avoid moisture condensing inside the UPS.

Chapter 2 : Introduction

2.1 General Overview

The M series UPS, available in 1kVA, 1.5kVA, 2kVA and 3kVA, is a line-interactive UPS providing sine-wave quality power to your electronic equipment. Each kVA model has internal batteries, and only 3kVA model can be connected to a Delta external battery pack. The unit's output power factor is 0.9 and its efficiency in online mode (full load) can reach at minimum 97% and 96% for 1/ 1.5kVA and 2/ 3kVA respectively. It produces greater electric power efficiency at less cost and its compact design is perfect for IT applications.

2.2 Package Inspection

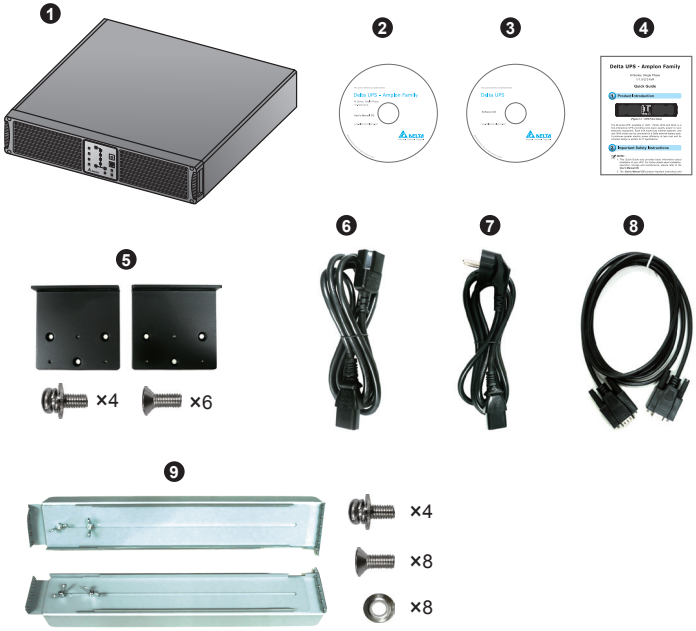
- **External**

  During UPS transportation, some unpredictable situations might occur. It is recommended that you inspect the UPS exterior packaging. If you notice any damage, please immediately contact the dealer from whom you purchased the unit.

- **Internal**

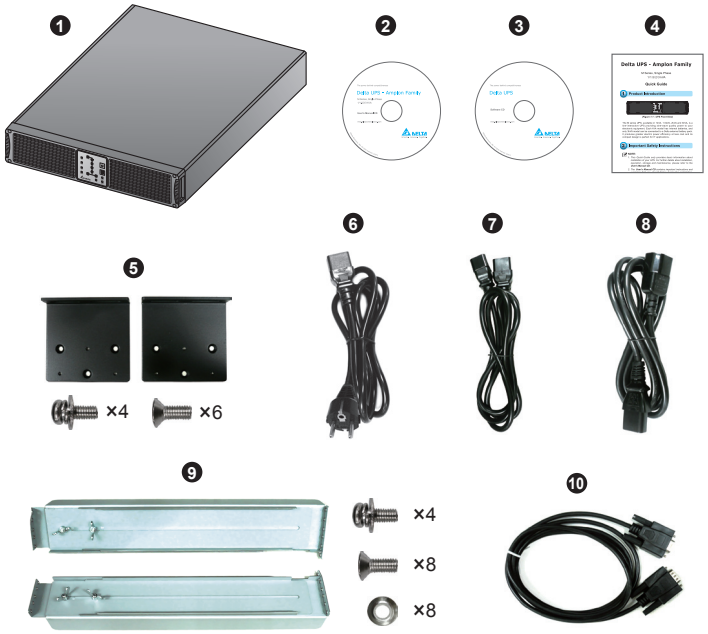
  1. Check the rating label stuck on the top of the UPS and make sure the device No. and capacity match what you ordered.
  2. Examine if any parts are loose or damaged.
  3. The UPS package contains the following items. Please check if any items are missing.

- **For 1kVA/ 1.5kVA model:**



No.	Item	Quantity
❶	UPS	1 PC
❷	User's Manual CD	1 PC
❸	Software CD-UPSentry 2012	1 PC
❹	Quick Guide	1 PC
❺	Bracket Ear	1 Set
❻	Output Cable 10A	1 PC
❼	Input Cable 10A	1 PC
❽	RS232 Cable	1 PC
❾	Rail Kit	1 Set

- **For 2kVA/ 3kVA model:**



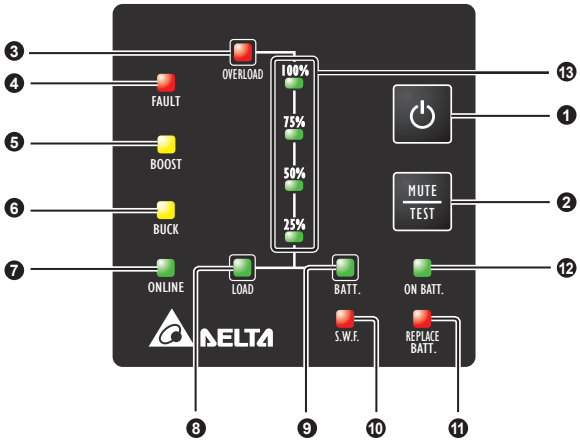
No.	Item	Quantity
❶	UPS	1 PC
❷	User's Manual CD	1 PC
❸	Software CD-UPSentry 2012	1 PC
❹	Quick Guide	1 PC
❺	Bracket Ear	1 Set
❻	Input Cable 16A	1 PC
❼	Output Cable 16A	1 PC
❽	Output Cable 10A	1 PC
❾	Rail Kit	1 Set
❿	RS232 Cable	1 PC

4. If there is any damage or anything missing, please immediately contact the dealer from whom you purchased the unit.
5. If the UPS needs to be returned, carefully repack the UPS and all of the accessories using the original packing material that came with the unit.

2.3 Features

- User-friendly LED indicators
- Output power factor =0.9
- Cold start
- REPO function
- Input breaker protection
- Generator compatible
- Hot swappable internal batteries and Delta external battery pack
- Battery deep discharging protection
- Intelligent monitor software connectivity through RS232 port or USB port
- Provides the following functions via configuration of UPSentry 2012 software (included in the provided CD), SNMP card (optional) or ModBus card (optional):
  1. Regular self-test
  2. History logs for records and analysis
  3. Battery remaining time & lock time estimate
  4. Real-time power condition monitoring
  5. System shutdown control
  6. UPS schedule ON/ OFF, 10 sec, and deep discharging test

2.4 Front Panel



(Figure 2-1 : Front Panel)

No.	Symbol	Name	Description
❶		ON/ OFF Button	1. When the UPS is OFF, press and hold this ON/ OFF button and release it when you hear one beep to turn on the UPS. 2. When the UPS is ON, press and hold this ON/ OFF button and release it when you hear one beep to turn off the UPS. **NOTE :** If the UPS is first turned on with AC applied, the unit will perform a 5-second self-test.

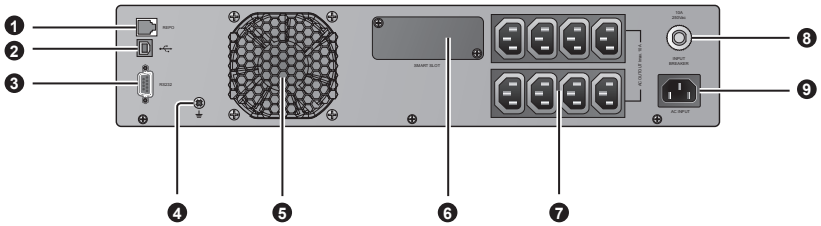
No.	Symbol	Name	Description
❷		MUTE/ TEST Button	1. When the UPS is ON and runs in online mode, press and hold this MUTE/ TEST button and release it when you hear four beeps to let the UPS perform a 10-second self test. 2. If a buzzer sounds, press this MUTE/ TEST button and release it immediately after you hear one beep to silence the buzzer. If you silence the buzzer, the buzzer will still go off when a new abnormal event occurs.
❸		OVERLOAD LED	1. LED On : Red . 2. Illuminates when the UPS is overloaded. For more information about an overload condition, please refer to ***5.2 Other Operating Details***.
❹		FAULT LED	1. LED On : Red. 2. Illuminates when the UPS detects an internal fault.
❺		BOOST LED	1. LED On : Yellow. 2. Blinks when the UPS is operating in boost mode to compensate input voltage discrepancy for an under voltage condition.
❻		BUCK LED	1. LED On : Yellow. 2. Blinks when the UPS is operating in buck mode to compensate input voltage discrepancy for an over voltage condition.
❼		ONLINE LED	1. LED On : Green. 2. Illuminates when the UPS is on and operating in AC normal mode. Please note that this LED also illuminates when the UPS runs in boost/ buck mode.
❽		LOAD LED	1. LED On : Green. 2. Illuminates to indicate the connected loads' status. For occupied rated capacity (%), please check Bar Graph LEDs.

No.	Symbol	Name	Description
❾		BATT. LED	1. LED On : Green. 2. Illuminates to indicate the battery capacity status. For battery remaining capacity (%), please check Bar Graph LEDs.
❿		S.W.F. (Site Wiring Fault) LED	1. LED On : Red . 2. Illuminates when the UPS detects a site-wiring problem (e.g. phase reversal, grounding missing and improper grounding). Please note that the left pin of the UPS's AC input socket is L phase.
⓫		REPLACE BATT. LED	1. LED On : Red. 2. Illuminates when the UPS detects a weak battery, a bad battery or a disconnected battery.
⓬		ON BATT. LED	1. LED On : Green. 2. Illuminates when the UPS is operating in battery mode.
⓭		Bar Graph LEDs	1. LED On : Green. 2. In online mode, the Bar Graph LEDs illuminate or flash to indicate the occupied rated capacity (%). In battery mode, the Bar Graph LEDs illuminate or flash to indicate the reaming battery capacity. • **Load Bar Graph LEDs** 1. When the total load is 0% of the rated capacity, no Bar Graph LED will illuminate. 2. When the total load is 0%~25% of the rated capacity, 25% LED will flash. 3. When the total load is 25%~50% of the rated capacity, 25% LED will illuminate and 50% LED will flash. 4. When the total load is 50%~75% of the rated capacity, 25% LED and 50% LED will illuminate and 75% LED will flash.

No.	Symbol	Name	Description
⑬		Bar Graph LEDs	5. When the total load is 75%~100% of the rated capacity, 25% LED, 50% LED and 75% LED will illuminate and 100% LED will flash. 6. When the total load is ≧100% of the rated capacity, all Bar Graph LEDs will illuminate. Please refer to ***5.2 Other Operating Details*** for overload information. • **Battery Bar Graph LEDs** 1. When the remaining battery capacity is 0%, no Bar Graph LED will illuminate. 2. When the remaining battery capacity is 0%~25%, 25% LED will flash. 3. When the remaining battery capacity is 25% ~50%, 25% LED will illuminate and 50% LED will flash. 4. When the remaining battery capacity is 50%~ 75%, 25% LED and 50% LED will illuminate and 75% LED will flash. 5. When the remaining battery capacity is 75% ~100%, 25% LED, 50% LED and 75% LED will illuminate and 100% LED will flash. 6. When the remaining battery capacity is ≧ 100%, all Bar Graph LED will illuminate.

2.5 Rear Panel

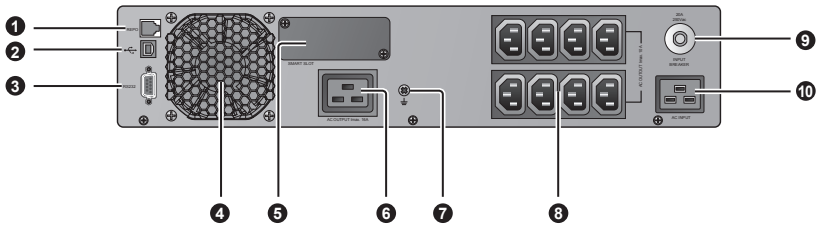
- **1kVA / 1.5kVA**



(Figure 2-2: 1kVA / 1.5kVA Rear Panel)

No.	Item	Function
❶	REPO Port	Shuts down the UPS completely. Please see ***5.2 Other Operating Details*** for more information.
❷	USB Port	Communication interface port. Please see ***Chapter 6 : Communication Interfaces*** for detailed information.
❸	RS232 Port	Communication interface port. Please see ***Chapter 6 : Communication Interfaces*** for detailed information.
❹	Ground Terminal	For UPS grounding.
❺	Fan	Cools and ventilates the UPS.
❻	Smart Slot	Accepts SNMP, Relay I/O or ModBus card. Please see ***Chapter 6 : Communication Interfaces*** for detailed information.
❼	Output Outlets (10A)	Connect to the loads.
❽	Input Breaker	Protects the utility power from further damage when the UPS fails. Please see ***5.2 Other Operating Details*** for detailed information.
❾	AC Input (10A)	Connects the UPS to the mains.

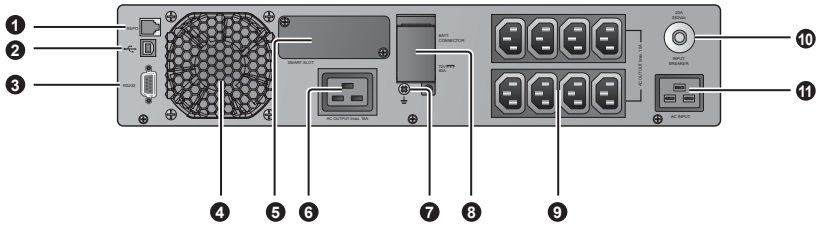
- **2kVA**



(Figure 2-3 : 2kVA Rear Panel)

No.	Item	Function
❶	REPO Port	Shuts down the UPS completely. Please see ***5.2 Other Operating Details*** for more information.
❷	USB Port	Communication interface port. Please see ***Chapter 6 : Communication Interfaces*** for detailed information.
❸	RS232 Port	Communication interface port. Please see ***Chapter 6 : Communication Interfaces*** for detailed information.
❹	Fan	Cools and ventilates the UPS.
❺	Smart Slot	Accepts SNMP, Relay I/O or ModBus card. Please see ***Chapter 6 : Communication Interfaces*** for detailed information.
❻	Output Outlet (16A)	Connects to the loads.
❼	Ground Terminal	For UPS grounding.
❽	Output Outlets (10A)	Connect to the loads.
❾	Input Breaker	Protects the utility power from further damage when the UPS fails. Please see ***5.2 Other Operating Details*** for detailed information.
❿	AC Input (16A)	Connects the UPS to the mains.

- **3kVA**



(Figure 2-4: 3kVA Rear Panel)

No.	Item	Function
❶	REPO Port	Shuts down the UPS completely. Please see ***5.2 Other Operating Details*** for more information.
❷	USB Port	Communication interface port. Please see ***Chapter 6 : Communication Interfaces*** for detailed information.
❸	RS232 Port	Communication interface port. Please see ***Chapter 6 : Communication Interfaces*** for detailed information.
❹	Fan	Cools and ventilates the UPS.
❺	Smart Slot	Accepts SNMP, Relay I/O or ModBus card. Please see ***Chapter 6 : Communication Interfaces*** for detailed information.
❻	Output Outlet (16A)	Connects to the loads.
❼	Ground Terminal	For UPS grounding.
❽	External Battery Pack Connector	Connects to a Delta external battery pack. Please see ***4.1 Delta External Battery Pack Connection*** for detailed information.
❾	Output Outlets (10A)	Connect to the loads.
❿	Input Breaker	Protects the utility power from further damage when the UPS fails. Please see ***5.2 Other Operating Details*** for detailed information.
⓫	AC Input (16A)	Connects the UPS to the mains.

Chapter 3 : Installation

NOTE :

1. Before installation, please read ***Chapter 1 : Important Safety Instructions*** thoroughly.
2. Only 3kVA UPS can be connected to a Delta external battery pack.
3. Only qualified service personnel can perform installation. If you want to install the UPS and the Delta external battery pack by yourself, installation must be under the supervision of qualified service personnel.

3.1 Installation Data

No.	Item	Specification
1	Installation environment	Indoor only
2	Operating temperature	0°C ~ 40°C
3	Relative humidity (non-condensing)	0%~95%
4	Max. altitude (without de-rating)	3,000 meters above sea level
5	Input power connection	Rear
6	Output power connection	Rear
7	Battery power connection (Only for 3kVA model)	Rear
8	Air inlet	Front
9	Air outlet	Rear

3.2 Rack Mounting the UPS or the Delta External Battery Pack (Optional)

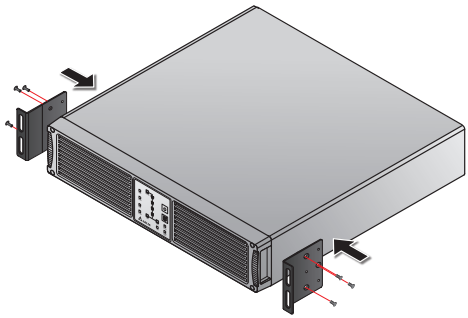
You can rack-mount the UPS and the Delta external battery pack (only applicable for 3kVA model) in four-post frames. The UPS and the Delta external battery pack use identical mounting kits and their mounting procedures are the same.

NOTE:

1. The UPS draws cooling air from its front. If your rack has a door on the front, make sure that there is sufficient clearance between the UPS vents and the rack door.
2. It is strongly recommended that at least two people lift the unit for rack-mounting. If there is only one person available, we suggest that the UPS's internal batteries should be taken out (less weight) before rack-mounting. After rack-mounting, reinstall the internal batteries.
3. Only use the provided bracket ears and rail kits to perform rack-mounting. NEVER depend on lower devices to support other devices.

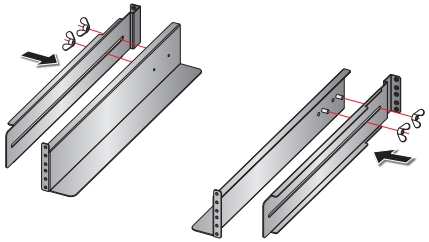
- **Rack-mounting procedures**

  1 Attach the included bracket ears to the lateral mounting holes of the UPS. See ***Figure 3-1***.



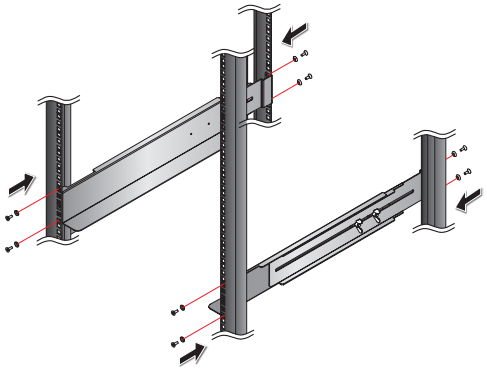
(Figure 3-1 : Mount the Bracket Ears)

  2 Adjust the length of the provided rails according to your rack and tighten the nuts. See ***Figure 3-2***.



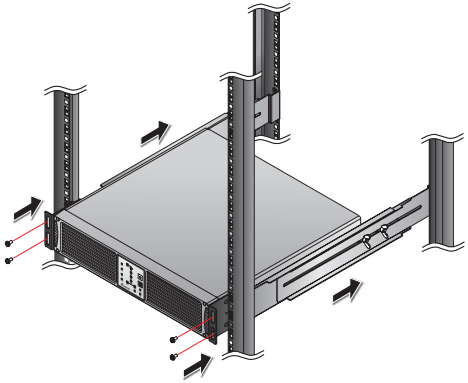
(Figure 3-2 : Adjust the Rails and Tighten the Nuts)

3 Use the provided eight screws and eight washers to attach the rails to your rack. See ***Figure 3-3***.



(Figure 3-3 : Attach the Rails to Your Rack)

4 Insert the UPS into the rack and tighten the provided four screws. See ***Figure 3-4***. Please note that there will be extra four screws left after installation. The four screws are spare parts.



(Figure 3-4 : Insert the UPS into Your Rack)

3.3 Tower Mounting the UPS or the Delta External Battery Pack (Optional)

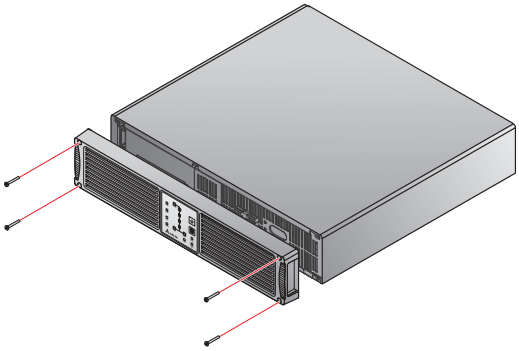
You can mount the UPS or the Delta external battery pack (only applicable for 3kVA model) in an upright position by following the procedures below. The UPS and the Delta external battery pack use identical mounting kits and their mounting procedures are the same. Please note that the package does not include any tower-mounting kits. If you need to purchase any, please contact Delta customer service.

NOTE:

1. The tower stand picture shown below is just descriptive.
2. Leave adequate space at least 15cm in front and rear of the UPS for proper ventilation.

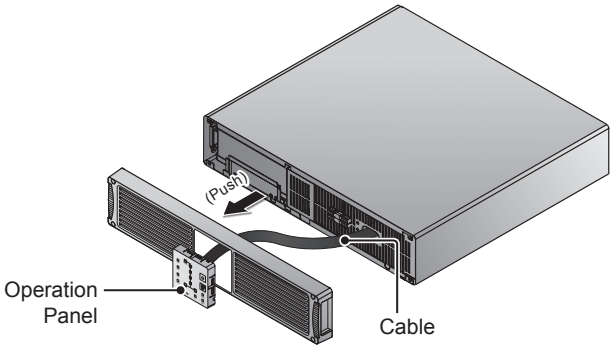
- **Tower mounting procedures**

〈1〉 Remove the four screws from the front plastic panel. See ***Figure 3-5***.



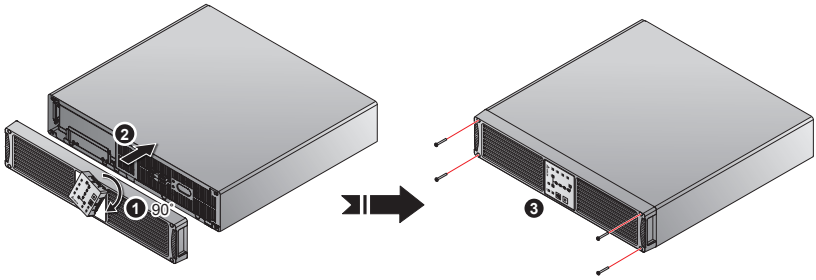
(Figure 3-5 : Remove the Front Plastic Panel)

〈2〉 From the back of the front plastic panel, carefully push the backside of the operation panel until it slides out of the front plastic panel. Please handle with care to avoid damaging the cable connecting the operation panel and the UPS's internal connector. See ***Figure 3-6.***



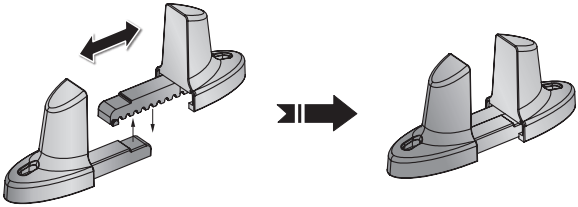
(Figure 3-6 : Push the Backside of the Operation Panel)

3 Rotate the operation panel 90° clockwise ❶ and reinstall it back into the front plastic panel ❷. Replace the front plastic panel and make sure the four screws are tightly fixed ❸. See ***Figure 3-7***.



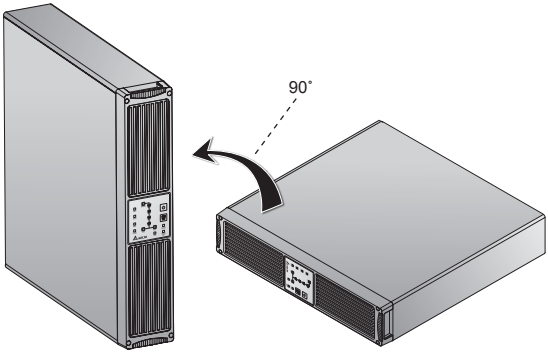
(Figure 3-7: Rotate the Operation Panel (90° Clockwise), Reinstall It, and Replace the Front Plastic Panel)

4 Assemble the tower stands (optional) by inserting the tenons into the grooves according to the size of the UPS. See ***Figure 3-8***.



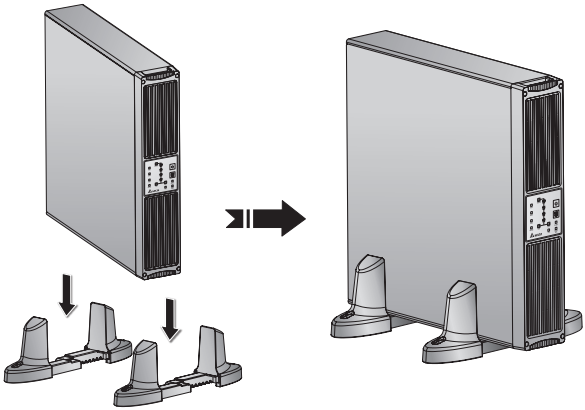
(Figure 3-8: Assemble the Tower Stands (Optional))

5 Carefully lift the UPS upright (at least two people are required) with the Delta logo shown on the operation panel facing up. See ***Figure 3-9***.



(Figure 3-9: Place the UPS Upright)

6 Place the UPS inside the tower stands (at least two people are required). See ***Figure 3-10***.



(Figure 3-10: Place the UPS Inside the Tower Stands (Optional))

Chapter 4 : Connections

- **Pre-connection warnings**

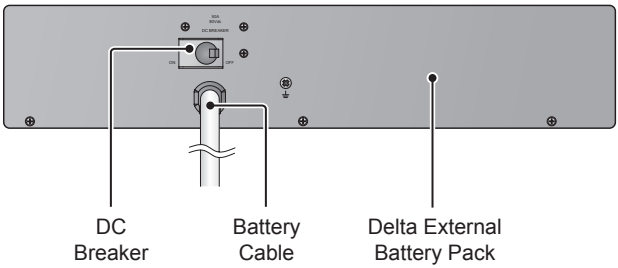
  1. Before connection, please read ***Chapter 1 : Important Safety Instructions*** thoroughly.
  2. The UPS is supplied with standard power cords and receptacles suitable for its use in your area of operation. Only qualified service personnel can perform installation, wiring, operation and maintenance.
  3. Before connecting any input wiring to the UPS, ensure that all circuits being used are the proper voltage and current required for the UPS. The power supply to the UPS must be single-phase in accordance with its rating label.
  4. Calculate the power consumption of the connected loads to ensure that an overload condition will not occur.
  5. Only 3kVA UPS can be connected to a Delta external battery pack. If you plan to connect a Delta external battery pack to a 3kVA UPS, please connect the battery pack to the UPS before UPS connection to the input power.
  6. Under EMC regulations, output cables can not be longer than 10 meters and communication cables can not be longer than 3 meters.
  7. Prior to providing any power to the UPS, the UPS must be suitably grounded. The unit is equipped with a safety-inspected mains line and must be connected to a wall socket with earthing-contact. If the wall socket does not have an earthing connection, please ground the UPS via the ground terminal locating at the rear of the UPS. Please see ***2.5 Rear Panel***.

4.1 Delta External Battery Pack Connection

NOTE :

1. Please read pre-connection warnings before connection.
2. If a Delta external battery pack needs to be used (only applicable for 3kVA model), connect the battery pack to the UPS prior to UPS connection to the input power. Please note that only one Delta external battery pack can be connected.

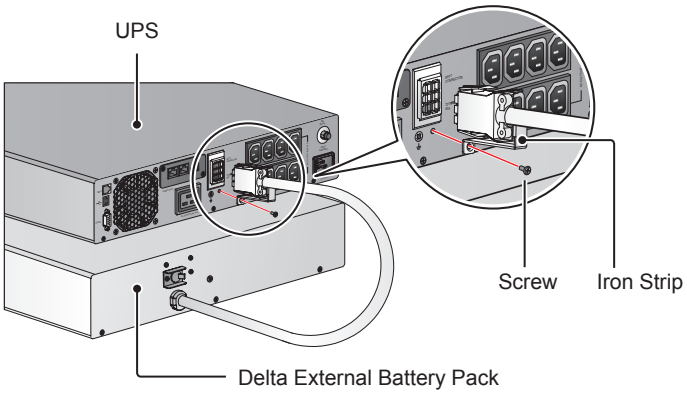
Please see the following figure for the rear view of the Delta external battery pack.



(Figure 4-1 : Delta External Battery Pack Rear View)

To connect a Delta external battery pack, follow the steps below:

1. Set the battery pack's DC breaker to the OFF position.
2. Remove the cover of the external battery pack connector locating on the rear side of the UPS.
3. Connect the battery cable attached to the Delta external battery pack to the UPS's battery pack connector. Make sure the battery cable's iron strip shown in the figure below is tightly screwed. Please see ***Figure 4-2***.



(Figure 4-2 : Connect the UPS and the Delta External Battery Pack)

4. Set the battery pack's DC breaker to the ON position.
5. Adjust the battery pack number reported in the UPSentry 2012 software (included in the provided CD) to be equal to one.

4.2 Connecting to Utility Power

1. Please read pre-connection warnings before connection.
2. Use the provided input cable to connect the UPS and a wall socket with earthing-contact. If the wall socket does not have an earthing connection, please ground the UPS via the ground terminal. Please see ***2.5 Rear Panel*** for ground terminal location.
3. Check whether the S.W.F (Site Wiring Fault) LED illuminates or not. If yes, pull out the mains plug, turn it and plug it correctly. Please note that the left pin of the UPS's AC input socket is L phase. If the S.W.F LED still illuminates, please contact service personnel.

NOTE:

1. The UPS will charge its internal batteries and the Delta external battery pack (if the Delta external battery pack is connected and its circuit breaker is turned on) whenever the UPS is connected to an AC source. There is an acceptable AC voltage present.
2. It is recommended that you charge the UPS's batteries for a minimum of 6 hours before use. If you don't do this, the UPS may be used immediately but the 'On-Battery' runtime may be less than normally expected.
3. If the UPS is going to be out of service or stored for a prolonged period of time, you must recharge the internal batteries at least 6 hours once every 3 months. If a Delta external battery pack is connected, the recharging time should not be less than 12 hours.
4. The batteries will immediately begin charging upon availability of the input power.

4.3 Connecting the loads

1. Please read pre-connection warnings before connection.
2. Calculate power consumption of your loads to ensure that an overload condition will not happen.
3. 1kVA/ 1.5kVA model has 10A output outlets in the rear. 2kVA/ 3kVA model has 10A output outlets and a 16A output outlet in the rear.
4. The package of 1kVA/ 1.5kVA model has one output cable (10A). The package of 2kVA/ 3kVA model has two output cables (10A & 16A). Please follow your loads to select proper cables to connect the UPS output outlets with the loads.

Chapter 5 : Operation

5.1 Operation Modes

- **Online Mode**

  During online mode, the ONLINE LED (green) and the LOAD LED (green) illuminate. If loads are connected to the UPS, the Bar Graph LEDs (green) will illuminate or flash to indicate the occupied rated capacity (%). For information about the Bar Graph LEDs, please refer to ***2.4 Front Panel***. In online mode, the connected loads are supplied by the utility AC power, and the UPS charges the batteries as needed and provides power protection to the connected loads from a variety of power line problems.

- **Battery Mode**

  When the UPS is operating during a power outage, the batteries provide DC power, which maintains inverter operation to support the loads. During battery mode, the ON BATT. LED (green) and the BATT. LED (green) illuminate, and the Bar Graph LEDs (green) illuminate or flash to indicate the reaming battery capacity. For information about the Bar Graph LEDs, please refer to ***2.4 Front Panel***. You can use the UPSentry 2012 software (included in the provided CD), SNMP card (optional), or ModBus card (optional) to monitor and estimate the battery remaining capacity before or during an AC power failure. For more information about the SNMP card (optional) or the ModBus card (optional), please refer to its user manual.

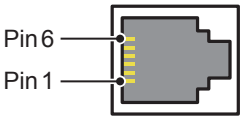
5.2 Other Operating Details

1. Please refer to ***2.4 Front Panel, 2.5 Rear Panel*** and ***Chapter 6 : Communication Interfaces*** to understand how to use the UPS interfaces.
2. **Cold Start :** The UPS is able to start up via battery source when there is no AC power available.
3. **Site Wiring Fault Detection :** The unit can detect if input line and input neutral have been inverted. If yes, the S.W.F LED on the front panel will illuminate (red).
4. **Battery Test :** The UPS can perform battery test manually upon user request or automatically. For automatic regular test, please install the UPSentry 2012 software (included in the provided CD), or configure the SNMP card (optional)

or ModBus card (optional). For manual battery test (only applicable for online mode), please press and hold the MUTE/ TEST button ( ) and release it when you hear four beeps to let the UPS perform a 10-second self test.

5. **Generator Compatible :** The UPS can operate with most of the generators available in the market.

6. **REPO Function :** The REPO port on the rear of the UPS allows user to shut down the UPS when an emergency occurs. Use a RJ11 cable to connect the REPO port and a user-supplied switch. In online mode or in battery mode, short pin 4 to pin 5 for approximately 0.5 second to shutdown the UPS.



(Figure 5-1 : REPO Port)

WARNING!
Do not connect a telephone line to this REPO port.

7. **Online Mode/ Battery Mode Overload Cut-off :**

   1) When the UPS is 110% ~125% overloaded either in online mode or in battery mode, the OVERLOAD LED will illuminate, the alarm will sound constantly, and the UPS will completely shutdown within 20 seconds.

   2) When the UPS is 125% ~150% overloaded either in online mode or in battery mode, the OVERLOAD LED will illuminate, the alarm will sound constantly, and the UPS will completely shutdown within 10 seconds.

   3) When the UPS is >150% overloaded either in online mode or in battery mode, the OVERLOAD LED will illuminate, the alarm will sound constantly, and the UPS will immediately shutdown.

   4) To clear an overload warning :

      - **In Online Mode :**

        After auto shutdown, the overload alarm will be off, the OVERLOAD LED will be still on, and the UPS will work in standby mode. Press the ON/ OFF button ( ) to let the UPS run in online mode. After that, the OVERLOAD LED will be off.

      - **In Battery Mode :**

        After auto shutdown, the overload alarm and the OVERLOAD LED will be off.

8. Input Breaker:

1) In Online Mode:

- When an over current issue occurs, the input breaker on the rear of the UPS will automatically activate and the unit will transfer to battery mode. After the abnormal issue is solved, press this input breaker and the unit will automatically switch back to online mode (you don't need to press the ON/ OFF button ( ) to start up the UPS).
- If an over current issue occurs, the input breaker on the rear of the UPS will automatically activate. If there is no battery power, the UPS will automatically shutdown. After the abnormal issue is solved, press the input breaker and the unit will automatically run in online mode (you don't need to press the ON/OFF button ( ) to start up the UPS).

2) In Battery Mode:

- When an over current issue occurs, the input breaker on the rear of the UPS will automatically activate and the unit will still run in battery mode. After the abnormal issue is solved, press the input breaker and the unit will automatically switch back to online mode (you don't need to press the ON/ OFF button ( ) to start up the UPS).

NOTE: When the input breaker automatically activates, it means that something wrong with the UPS or its connected loads. It is highly recommended that you turn off the UPS, remove the input power cord, and let qualified service personnel carefully inspect the UPS, its connected loads and the surrounding environments.

5.3 Start-up Procedure

When the UPS is OFF, press and hold the ON/ OFF button ( ) and release it when you hear one beep to turn on the UPS. If the UPS is first turned on with AC applied, the unit will perform a 5-second self-test.

5.4 Shutdown Procedure

When the UPS is ON, press and hold the ON/ OFF button ( ) and release it when you hear one beep to turn off the UPS. Though you have turned off the unit, the UPS continues charging the batteries whenever it is plugged into a wall outlet and there is acceptable AC voltage present.

5.5 UPS Self Test

1. If the UPS is first turned on with AC applied, the unit will perform a 5-second self-test.
2. When the UPS is ON and runs in online mode, press and hold the MUTE/ TEST button (MUTE TEST), release it when you hear four beeps and the UPS performs a 10-second self test.
3. You can use the UPSentry 2012 software (included in the provided CD), the SNMP card (optional) or the ModBus card (optional) to let the UPS perform a 10-second self test, a regular test and battery deep discharging.

5.6 Alarm

No.	Condition	Alarm	LED
1	Battery Mode	The audible alarm sounds once every-ten second.	ON BATT. LED and BATT. LED illuminate (green).
2	Low Battery	The audible alarm beeps twice every-five second.	ON BATT. LED illuminates (green) and BATT. LED flashes (green).
3	Battery Missing/ Replacement/ Weak	The audible alarm beeps three times every-five minute.*	REPLACE BATT. LED illuminates (red)
4	Overload	The audible alarm sounds constantly.	OVERLOAD LED illuminates (red).
5	Internal Fault	The audible alarm sounds constantly when the UPS detects an internal fault.	FAULT LED illuminates (red).

NOTE : * After reconnecting or replacing the batteries, it might take a while for the UPS to switch off the alarm automatically. If, after a period of time, the audible alarm still exists, user must initiate a self-test (press and hold the MUTE/ TEST button (MUTE TEST) and release it after you hear four beeps) to clear the alarm.

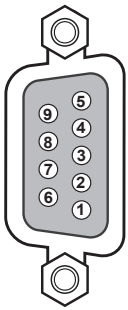
Chapter 6 : Communication Interfaces

NOTE : The UPS can still function properly without making the connections below.

The M series UPS's communication interfaces include an RS232 port, a USB port and a smart slot. Please refer to ***2.5 Rear Panel*** for their locations. You can use all of the communication interfaces at the same time and it won't influence each interface's function.

- **RS232 Port**

  You can use the provided RS232 cable to connect the UPS with a computer and use the included CD to install the UPSentry 2012 software to record UPS power events, set up alarms, and shut down the UPS safely in a network environment. The pin assignment of this RS232 port is defined as follows.



(Figure 6-1 : RS232 Port)

Pin	RS232 Pin Assignment Description
2	UPS TXD (Typical RS232 level)
3	UPS RXD (Typical RS232 level)
5	GND

Communication setting for RS232 port	
Baud Rate	2400
Data Length	8 bits
Stop Bit	1 bit
Parity	None

RS232 Other Pin Applications : Alarm Signal & Remote Shutdown		
Condition	Pin	Action
Battery Low	1	The signal activates when the battery capacity is below the pre-alarm threshold.
AC Fail	9	The signal activates when the mains voltage at the UPS input is not present or the mains voltage is out of the tolerance range. The signal will be off following mains restoration.
Sum Alarm	8	The signal activates when an internal fault is detected.
Remote Shutdown	3 & 6	Remote shutdown is ONLY applicable to battery mode. For remote shutdown, short Pin 3 and Pin 6 for approximate 5 seconds, and then the UPS will shutdown after 60 seconds.

NOTE : Other pins are reserved and cannot be used.

- **USB Port**

  Besides RS232 port, the UPS also provides another channel, USB port, for user to monitor the UPS status via a computer. Simply plug a USB cable (not provided) into the UPS and your computer, install the UPSentry 2012 software (included in the provided CD), and follow the prompts on your screen to complete the software installation.

- **Smart Slot**

  You can choose optional cards to monitor the UPS or to enhance the UPS function. The list of optional cards is shown in the table below.

Optional Card	Function
SNMP Card (IPv4 or IPv6)	Helps you remotely monitor and control the status of the UPS via a network system.
Relay I/O Card	Increases the quantity of dry contacts.
ModBus Card	Lets the UPS have ModBus communication.

NOTE : For more detailed information about optional cards, please contact service personnel. If you need to purchase any optional card, please contact your local dealer or customer service.

Chapter 7 : Optional Accessories

There are several optional accessories available for this M series UPS. Please refer to the table below for the optional accessories and their functions.

No.	Item	Function
1	Tower Stands	Sustain the UPS vertically.
2	Delta External Battery Pack	Provides external batteries that let the UPS supply power to the loads connected when a power failure occurs.
3	EnviroProbe	Monitors temperature, humidity and other conditions in a room environment. **NOTE :** The EnvioProbe should work with either an SNMP card or an EMS2000.
4	SNMP Card (IPv4 or IPv6)	Monitors and controls the status of the UPS via a network system.
5	Relay I/O Card	Increases the quantity of dry contacts.
6	ModBus Card	Lets the UPS have ModBus communication function.

NOTE :

1. For detailed installation and operation of any accessory mentioned above, please refer to the Quick Guide, User Guide, or Installation & Operation Guide included in the package of the relevant optional accessory.
2. If you want to buy any accessory mentioned above, please contact your local dealer or customer service.

Chapter 8 : Maintenance

8.1 UPS

- **UPS Cleaning**

  Regularly clean the UPS, especially the slits and openings, to ensure that the air freely flows into the UPS to avoid overheating. If necessary, use an air-gun to clean the slits and openings to prevent any object from blocking or covering these areas.

- **UPS Regular Inspection**

  Regularly check the UPS every half year and inspect:

  1. Whether the UPS, LEDs, and alarm function are operating normally.
  2. Whether battery voltage is normal. If battery voltage is too high or too low, find the root cause.

8.2 Batteries

The M series UPS uses sealed lead-acid batteries. Though the typical battery life cycle is 3 years, the battery life depends on the temperature, the usage, and the charging/ discharging frequency. High temperature environments and high charging/ discharging frequency will quickly shorten the battery life. The UPS does not require maintenance by the user; however, the batteries should be checked periodically. Please follow the suggestions below to ensure a normal battery lifetime.

- Keep usage temperature at 25°C.
- When the UPS needs to be stored for an extended period of time, the batteries must be recharged once every three months and the charging time must not be less than 6 hours each time. If a Delta external battery pack is connected, the charging time should not be less than 12 hours.

NOTE: If the UPS's internal batteries need to be replaced, please contact qualified service personnel. During battery replacement, the loads attached to the UPS will not be protected if input power fails.

Chapter 9 : Troubleshooting

1. When a problem occur, please check if the following situations exist before contacting Delta service personnel:
   - Is the mains voltage present at the UPS input?
   - Is the input breaker tripped?
2. Please have the following information ready if you would like to contact the Delta service personnel:
   - Unit information including model, serial number, etc.
   - An exact description of the problem. The more detailed description of the problem, the better.
3. When you see the following problems occur, please follow the solutions shown below.

NO.	Problem	Possible Cause	Solution
1	No LED illuminates / No alarm goes off.	The ON/ OFF button ( ) is not turned on.	Press and hold the ON/ OFF button ( ) and release it when you hear one beep to turn on the UPS.
		The mains voltage is not present.	Please contact qualified electrician to inspect the status of the mains.
2	The UPS is not turned on.	The ON/ OFF button ( ) is not turned on.	Press and hold the ON/ OFF button ( ) and release it when you hear one beep to turn on the UPS.
3	The UPS runs in battery mode even when the AC source is normal.	The input breaker is tripped.	Press the input breaker to reset it. If the input breaker trips again after the UPS starts up, contact service personnel.
		The input power cord is not firmly connected.	Connect the input power cord firmly.

NO.	Problem	Possible Cause	Solution
4	FAULT LED illuminates	An internal fault has been detected.	Contact service personnel.
5	S.W.F LED illuminates	1. Phase reversal on input power has been detected. 2. Something wrong with your building wiring (e.g. reversed polarity).	1. Pull out the input cable, turn it and plug it correctly. Please note that the left pin of the UPS's AC input socket is L phase. 2. Contact a qualified electrician to check your building wiring.
6	ONLINE LED illuminates but there is no output	The output cable is not firmly connected.	Connect the output cable firmly. If the problem still exists, please contact service personnel.
7	REPLACE BATT. LED illuminates	Weak batteries, bad batteries or poor battery connections.	Charge the batteries for 6 hours, replace the batteries or check the battery connections.
8	OVERLOAD LED illuminates & buzzer beeps constantly	The UPS is overloaded.	1. Decrease some loads. 2. Refer to ***5.2 Other Operating Details*** to clear an overload warning.
9	In battery mode, the UPS does not provide expected runtime.	The batteries might be weak or the lifetime is due.	Charge the batteries for 6 hours and retest the runtime. If the runtime is still less than expected after charging, replace the batteries even if the REPLACE BATT. LED doesn't illuminate.
		The Delta external battery pack's DC breaker is not turned on.	If a Delta external battery pack is used, check if the DC breaker is turned on.

NO.	Problem	Possible Cause	Solution
10	No communication between the UPS and your PC	Wrong connection cable is used.	Check whether the connection cable is correct or not.
		The connection cable is not firmly connected.	Connect the communication cable firmly.
		You PC's interface is being used by another process or is defective.	Check if there is other software or service accessing the interface on your PC, or try to select a different serial interface.
		There is interference on the connection cable.	1. Lay the cable differently or reconnect the cable. 2. Check if any high current cables nearby. If yes, route the connection cable away from the high current cables.

Appendix 1 : Specifications

Model		M-1K	M-1.5K	M-2K	M-3K
Capacity	Power Rating	1 kVA/ 0.9 kW	1.5 kVA/ 1.35 kW	2 kVA/ 1.8 kW	3 kVA/ 2.7 kW
Input	Nominal Voltage	220, 230, 240 Vac (Single Phase)			
	Voltage Range	220 Vac : 180 Vac ~ 266 Vac 230 Vac : 188 Vac ~ 278 Vac 240 Vac : 196 Vac ~ 290 Vac			
	AVR	One boost and one buck			
	Frequency Range	50/60 Hz (± 5 Hz) Auto selectable			
Output	Voltage	220, 230 (Default), 240 Vac (Single Phase)			
	Voltage Regulation	± 10%			
	Power Factor	0.9			
	Frequency	50/60 Hz (± 0.1 Hz)			
	Overload (Online mode & battery mode)	111% ~ 125% : Shutdown after 20 sec. 126 ~ 150% : Shutdown after 10 sec. > 150% : Shutdown immediately			
	Efficiency (Online mode)	> 97%	> 97%	> 96%	> 96%
	Efficiency (AVR mode)	> 93%			
Internal Batteries	Nominal Voltage	36 Vdc	36 Vdc	72 Vdc	72 Vdc
	Type	7 Ah	9 Ah	7 Ah	9 Ah
Internal Batteries	Back-up Time	≧ 4 minutes (full load) ≧ 10 minutes (half load)			
	Charging Capacity	6 hours to 90%			
Interface	Standard	RS232, USB, Smart Slot, REPO			

Model		M-1K	M-1.5K	M-2K	M-3K
Environment	Relative Humidity	0 ~ 95% (non-condensing)			
	Operating Temperature	0 ~ 40°C			
	Noise_1 meter	< 45 dBA	< 45 dBA	< 60 dBA	< 60 dBA
Physical	Display	LEDs			
	Dimensions (W × D × H)	440 × 429.4 × 88.5 mm		440 × 608 × 88.5 mm	
	Weight	18.5 kg	19.2 kg	33 kg	34.7 kg
	Input Connector	IEC-320-C14 (Q'ty:1 PC)		IEC-320-C20 (Q'ty:1 PC)	
	Output Connector	IEC-320-C13 (Q'ty:2×4 PCS)		IEC-320-C13 (Q'ty:2×4 PCS) IEC-320-C19 (Q'ty:1 PC)	
Standard Compliance	Certification	• CE • CB Report (by TUV) • EN 62040-1 • EMC EN62040-2 C1			
Delta External Battery Pack (Optional and Only Applicable for 3 kVA Model)					
Dimensions (W × D × H)		440 × 429.4 × 88.5 mm			
Weight		23.3 kg			
Nominal Voltage		72 Vdc			
Type		9 Ah			

NOTE:

1. Refer to the rating label for the safety rating.
2. All specifications are subject to change without prior notice.

Appendix 2 : Warranty

Seller warrants this product, if used in accordance with all applicable instructions, to be free from original defects in material and workmanship within the warranty period. If the product has any failure problem within the warranty period, Seller will repair or replace the product at its sole discretion according to the failure situation.

This warranty does not apply to normal wear or to damage resulting from improper installation, operation, usage, maintenance or irresistible force (i.e. war, fire, natural disaster, etc.), and this warranty also expressly excludes all incidental and consequential damages.

Maintenance service for a fee is provided for any damage out of the warranty period. If any maintenance is required, please directly contact the supplier or Seller.

WARNING!

The individual user should take care to determine prior to use whether the environment and the load characteristic are suitable, adequate or safe for the installation and the usage of this product. The User Manual must be carefully followed. Seller makes no representation or warranty as to the suitability or fitness of this product for any specific application.

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